

REMARKS

Amendments

Claim 1 is amended to delete correct an obvious typographical error. Claim 1 is also amended to incorporate the recitation of claim 7, now cancelled. New claim 21 corresponds to the prior version of claim 13.

Claim Objection

The objection to claim 1 is rendered moot by the above amendment. Withdrawal of the objection is respectfully requested.

Information Disclosure Statement

Applicants submit herewith another Information Disclosure Statement listing all of the references cited in the ISR, as well as a copy of the ISR and copies of the references cited therein. Consideration of the Information Disclosure Statement is respectfully requested.

Rejection under 35 USC §103(a) in view of Barcock et al. and Urasaki et al.

Claims 1, 5, 8, 11-13, 15, 16 and 20 are rejected as allegedly being obvious in view of Barcock et al. (US 6,502,935) in combination with Urasaki et al. (US 6,403,198). This rejection is respectfully traversed.

As noted above, claim 1 is amended to incorporate the recitation of claim 7. Claim 7 is not rejected in view of this combination of prior art. Claims 5, 8, 11-13, 16 and 20 depend from amended claim 1. Withdrawal of the rejection is respectfully requested.

With respect to new claim 21, which corresponds to the prior version of claim 13, Barcock et al. disclose an ink jet recording material that comprises a support material, a lower pigment layer containing barium sulphate, and an upper pigment layer containing aluminum oxide as a main pigment. See column 2, lines 1-5.

In the rejection, it is asserted that the upper pigment layer of Barcock et al. "is equivalent to the claimed high gloss cast coating layer." Barcock et al. disclose that the pigment mixture of

the upper layer consists of two finely divided pigments, preferably a mixture of 50-150 nm aluminum oxide particles and 200-300 nm silica particles. See column 2, lines 62-66. The mass ratio of aluminum oxide to silica is said to be 4:1 to 1:1. See column 3, lines 2-3. The binder for the upper layer can be partially or completely saponified polyvinyl alcohol. See column 3, lines 13-19.

As noted in the rejection, Barcock et al. do not disclose the use of two kinds of polyvinyl alcohol as a binder for the upper layer. But, additionally, Barcock et al. do not disclose or suggest forming the cast coating recording layer by the wet method comprising solidifying the binder in the coating layer, while the coating layer is still in the wet state, using a solidifying solution that contains boric acid and a borate.

Example 1 describes the manufacture of ink jet recording materials in accordance with the disclosure of Barcock et al. As stated in the Example, the lower pigment layer is applied to raw paper. A second coating solution is then applied to the lower layer using a slot-die, followed by drying at 100° C, to form an upper layer 1B. The compositions of the upper layers are presented in Table 2.

Barcock et al. provide no disclosure of using a solidifying solution in forming the upper layer. It is noted that the upper layers contain a small amount of boric acid. But, there is no suggestion by Barcock et al. of adding a solidifying solution that contains boric acid and a borate while the upper layer is still in the wet state.

Urasaki et al. do refer to the use of either boric acid or a borate to gelatize polyvinyl alcohol (see column 2, lines 47-65), but do not provide any suggestion of using boric acid and a borate together. Compare applicants' disclosure at page 19, line 3-page 20, line 2.

Moreover, while Urasaki et al. do refer to the use of either boric acid or a borate, they actually suggest away from the use of such agents. As set forth at column 2, lines 52-65:

However, the gelling reaction of polyvinyl alcohol and boric acid or a borate is very fast, and change in viscosity of the coating solution with time cannot be avoided and, hence, coating stability becomes inferior. Moreover, the gelling product causes streaking and, thus, results in deterioration of surface quality.

In view of the above remarks, it is respectfully that the disclosure of Barcock et al., taken

alone or in combination with that of Urasaki et al., fails to render obvious applicants' claimed invention as recited in claim 21. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC §103(a) in view of Barcock et al., Urasaki et al. and Ogawa et al.

Claims 11-13 are rejected as allegedly being obvious in view of Barcock et al. (US 6,502,935) in combination with Urasaki et al. (US 6,403,198) and Ogawa et al. (US 5,750,200). This rejection is respectfully traversed.

The disclosures of Barcock et al. and Urasaki et al. are discussed above.

As noted above, claim 1 is amended to incorporate the recitation of claim 7. Claim 7 is not rejected in view of this combination of prior art. Claims 11-13 depend from amended claim 1. Thus, withdrawal of the rejection is respectfully requested.

Regarding new claim 21, Ogawa et al. disclose a process for producing an ink jet recording sheet comprising forming at least one ink-receiving layer, consisting essentially of a pigment and a binder, on a support, and then coating on the ink-receiving layer a coating composition, consisting essentially of a pigment and a binder, to form a gloss-providing layer. Thereafter, a heated specular roll is press-contacted directly to the surface of the gloss-providing layer, while the surface is still in a wet state, to provide a specular finish. See column 4, lines 33-47.

The disclosure of Ogawa et al. is completely devoid of any reference to using boric acid and a borate in a solidifying solution. Nor do Ogawa et al. suggest adding a solidifying solution that contains boric acid and a borate to the gloss-providing layer while the latter is still in the wet state. Thus, the disclosure of Ogawa et al. does not overcome the deficiencies in the combined disclosures of Barcock et al. and Urasaki et al.

In view of the above remarks, it is respectfully that the disclosure of Barcock et al., taken alone or in combination with that of Urasaki et al. and/or Ogawa et al, fails to render obvious applicants' claimed invention as recited in claim 21. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC §103(a) in view of Barcock et al., Urasaki et al. and Ichioka et al.

Claim 3 is rejected as allegedly being obvious in view of Barcock et al. (US 6,502,935) in combination with Urasaki et al. (US 6,403,198) and Ichioka et al. (US 6,177,188). This rejection is respectfully traversed.

As noted above, claim 1 is amended to incorporate the recitation of claim 7. Claim 7 is not rejected in view of this combination of prior art. Claim 3 depends from amended claim 1. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC §103(a) in view of Barcock et al., Urasaki et al. and Sakaki et al.

Claims 6, 7, and 14 are rejected as allegedly being obvious in view of Barcock et al. (US 6,502,935) in combination with Urasaki et al. (US 6,403,198) and Sakaki et al. (US 5,246,774). This rejection is respectfully traversed.

The disclosures of Barcock et al. and Urasaki et al. are discussed above. Both of these patents deal with pigment layers based on aluminum oxide. Sakaki et al., on the other hand, is directed to pigment layers based on magnesium carbonate.

In particular, Sakaki et al. discloses three embodiments: (1) a recording medium comprising a substrate and an ink-receiving layer containing a spherical basic magnesium carbonate; (2) a recording medium comprising a substrate and an ink-receiving layer containing an amorphous magnesium carbonate; and (3) a recording medium comprising a substrate and an ink-receiving layer containing an aluminum oxide and a basic magnesium carbonate.

In the rejection, the Examiner points to the disclosure of Sakaki et al. at column 8, line 22 and column 9, lines 3-5. These disclosures deal with the third embodiment, i.e., the ink-receiving layer containing an aluminum oxide and a basic magnesium carbonate. At column 8, lines 56-61, Sakaki et al. disclose that the effect of capturing dyes in the surface of the ink-receiving layer can be improved by using alumina having a specific range of surface area. It is noted that this disclosure refers to an improvement in the surface of “the ink-receiving layer.” In context, this refers to an improvement in the ink-receiving layer which contains an aluminum oxide and a basic magnesium carbonate. This is not directed to an improvement in all types of ink-receiving layers, and clearly does not suggest an improvement in ink-receiving layers containing aluminum oxide and silica.

In the text bridging columns 8 and 9, Sakaki et al. describe a preferred use of aluminum oxide particles having a particle size of 1 nm to 10 μm and that the use of particles with large average particle size “may result in an increase in blurs.” Here again, this disclosure is in the context of the ink-receiving layer which contains an aluminum oxide and a basic magnesium carbonate. This is not directed to all types of ink-receiving layers, and clearly does not suggest modifying ink-receiving layers containing aluminum oxide and silica.

In particular, the disclosure by Sakaki et al. of using aluminum oxide particles having a particle size of 1 nm to 10 μm in combination with particles of basic magnesium carbonate (suggested particle size 1 μm to 20 μm ; column 9, lines 58-59) provides no suggestion of using aluminum oxide particles having a particle size of 1.0 – 4.0 μm in the upper layer of Barcock et al. At column 2, lines 62-64, Barcock et al. expressly state that the particle sizes of the pigments in the upper layer “**shall not be larger than 500nm.**”

Additionally, the disclosure of Sakaki et al. does not suggest using aluminum oxide particles that have a particle size greater than the silica particles in the upper layer of Barcock et al. In the particle size ranges provided by Barcock et al. (50-150 nm alumina; 200-300 nm silica), the alumina particles are clearly smaller than the silica particles. Nothing in either disclosure suggests using alumina particles that are larger than the silica particles.

In view of the above remarks, it is respectfully that Barcock et al., taken alone or in combination with Urasaki et al. and/or Sakaki et al. fails to render obvious applicants’ claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC §103(a) in view of Mukoyoshi et al., Yasuda et al., and Urasaki et al.

Claims 1, 4, 9-13, and 16-19 are rejected as allegedly being obvious in view of Mukoyoshi et al. (US 6,242,082) in combination with Yasuda et al. (US 5,213,873) and Urasaki et al. (US 6,403,198).

As noted above, claim 1 is amended to incorporate the recitation of claim 7. Claim 7 is not rejected in view of this combination of prior art. Claims 4, 11-13, and 16-19 depend from amended claim 1. Withdrawal of the rejection is respectfully requested.

With respect to new claim 21, which corresponds to the prior version of claim 13, Mukoyoshi et al. disclose that their gloss layer, which the rejection asserts is equivalent to the claimed high gloss cast coating, can be formed by a wet casting method in which a surface of the ink receiving layers or of the support paper sheet is coated with a coating liquid. The coating liquid layer is brought, while in the wetted condition, into contact under pressure with a mirror-finished casting surface of a heated casting drum. The coating liquid layer is then dried and the dried gloss layer is separated from the casting drum surface. Alternatively, the gloss layer can be formed by a re-wet casting method in which the dried coating layer is rewetted with an aqueous rewetting liquid, and then the rewetted coating layer is brought into contact with a mirror-finished casting surface of a heated casting drum and dried. See column 10, lines 15-42.

The disclosure of Mukoyoshi et al. is completely devoid of any reference to using boric acid and a borate in a solidifying solution. Nor do Mukoyoshi et al. suggest adding a solidifying solution that contains boric acid and a borate to the gloss layer while the latter is still in the wet state.

Yasuda et al. disclose an aqueous ink-jet recording sheet comprising a neutral paper substrate sheet and an aqueous ink image-receiving layer comprising (a) fine, oil absorbing silica particles, (b) polyvinyl alcohol binder and (c) a water resisting agent comprising a cationic, water-soluble acrylic copolymer having side chains attached to a vinyl backbone chain and each having at least two cationic radicals. See column 4, lines 8-22.

As with the disclosure of Mukoyoshi et al., the disclosure of Yasuda et al. is completely devoid of any reference to using boric acid and a borate in a solidifying solution. Nor do Yasuda et al. suggest adding a solidifying solution that contains boric acid and a borate to the gloss layer while the latter is still in the wet state.

As discussed previously, Urasaki et al. do refer to the use of either boric acid or a borate to gelatize polyvinyl alcohol (see column 2, lines 47-65), but do not provide any suggestion of using boric acid and a borate together. Compare applicants' disclosure at page 19, line 3-page 20, line 2.

Moreover, while Urasaki et al. do refer to the use of either boric acid or a borate, they actually suggest away from the use of such agents. As set forth at column 2, lines 52-65:

However, the gelling reaction of polyvinyl alcohol and boric acid or a borate is very fast, and change in viscosity of the coating solution with time cannot be avoided and, hence, coating stability becomes inferior. Moreover, the gelling product causes streaking and, thus, results in deterioration of surface quality.

In view of the above remarks, it is respectfully that the disclosure of Mukoyoshi et al., taken alone or in combination with that of Urasaki et al. and/or Yasuda et al., fails to render obvious applicants' claimed invention as recited in claim 21. Withdrawal of the rejection is respectfully requested.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

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